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ATTORNEYS AT LAW

May 4, 2001

Assistant Commissioner for Patents
Washington, D.C. 20231

Attorney Docket: 32221-170976

Attention: PCT-DO/US

Re: International Application PCT/DE99/03483
Priority Claimed: German Appl. No. 198 51 284.8 filed November 6, 1998

Inventor(s): Peter STAMM

Title: DEVICE FOR RECORDING PICTURES OF PARCEL SURFACES

Sir:

Submitted herewith, as the first submission, are the following for the purposes of entering the national stage for the USA under 35 U.S.C. 371(c), **immediate national examination under 35 U.S.C. 371(f) being requested.**

- ☒ German-language International Application No. PCT/DE99/03483 published as WO 00/27549.
- ☒ Translation of International Application.
- ☒ Formal Drawings (One sheet Figs. 1 and 2).
- ☒ Declaration
- ☒ German language International Preliminary Examination Report.
- ☒ Information Disclosure Statement, German-language International Search Report, German Office Action and translation, Form PTO 1449 and references cited.

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Note: For purposes of U.S. Examination, please insert the amended pages annexed to the International Preliminary Examination Report, so that the application will comprise the following pages of the English translation:

Specification: Original Pages 1, 1a
Amended Pages 2, 2a, 3, 3a, 4
Claims: Amend Page 5 containing claim 1
Abstract: Amended Page 6

Fees: (see formula below) Check Enclosed

Basic National Fee \$860.00/430.00..... \$860.00
Assignment Fee..... \$ 40.00

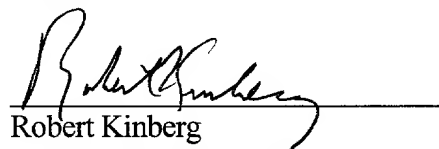
TOTAL FEES FOR THE ABOVE APPLICATION... \$900.00

In the event there is attached hereto no check, or a check for an insufficient amount, please charge the fee to our Account No. 22-0261 and notify us accordingly.

Please use the following address for corresponding with all counsel of record:

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Respectfully submitted,


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1/PRTS

Description

Device for Recording Pictures of Parcel Surfaces

5 The invention relates to a device for recording pictures of parcel surfaces in accordance with the preamble to claim 1.

10 Parcels are automatically sorted and distributed in respective facilities on the basis of the distribution information affixed to the surface, in most cases the receiver addresses. In the process, the parcels that are positioned on a conveying device are moved at relatively high speed, approximately 2m/second, and in part very small distances between the parcels past the picture-recording device, which makes the recorded pictures available to an OCR reader. Since the parcel height fluctuates considerably, the optical system of the picture-recording device must be adapted during very short intervals to the various distances between camera and parcel surfaces, so that the pictures to be evaluated do not show fluctuations in quality.

15 With known solutions, the picture sharpness was therefore adapted automatically to the varied distances between parcel surface and picture recording device. For this, the distance was measured with a height sensor that is known per se, for example a laser sensor or a light-barrier line. Based on the measured distance, the picture sharpness was either adapted accordingly by moving the individual lenses of an objective for a picture-recording device installed vertically above the parcel (EP-A-0796 671). Or, the receiver in the picture plane, for example a CCD line sensor, was displaced relative to the lens in

the direction of the optical axis to create a sharper picture. In the process, the lighting that is usually integrated into the scanner is beamed at an angle onto the parcel, that is to say at an angle in transporting direction.

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The following disadvantages are tied to this:

- Depending on the parcel height, different picture scales result and thus also different resolutions in the picture. High parcels have a large resolution and low parcels have a small resolution, consequently resulting in a smaller scanning width for high parcels and a larger scanning width for low parcels.
- If the picture recording device, which views the parcel surface at an angle, as seen in conveying direction, is fixedly connected to a lighting device, it leads to undesirable shadow formation because of the change from high to low parcels and the short distances between the parcels.

A device for recording pictures of parcel surfaces containing distribution information is disclosed in Japanese Patent Abstracts Vol. 014, No. 438 (P-1108) dated September 19, 1990 and JP 02 171883 A (NEC Corp.) dated July 3, 1990. The device comprises a camera directed perpendicular to the parcel surface to be recorded and provided with a CCD sensor and camera lens, as well as at least one sensor for measuring the parcel height and a control device for generating adjustment signals for the camera in dependence on the measured parcel height. The device furthermore is provided with conveying means for continuously conveying the parcels past the camera, wherein the camera lens is a zoom lens with fast zoom adjustment drive and autofocus. The fast zoom adjustment drive can be actuated by the control device in such a way that the

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picture scale is always the same, regardless of the previously measured height of the parcel surface containing the distribution information.

It is also known in this connection that the zoom adjustment drive contains a linear motor (Japanese Patent Abstracts, Vol. 1997, No. 01 from January 31, 1997 and JP 08 248291 A (Sony Corp.) dated September 27, 1996).

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Also disclosed is a method for beaming light onto the surface from the side by means of alternately working stroboscope lamps to determine the edges of glued-on address labels or of address windows on letters. Pictures with shadows are subtracted from each other with this method. However, this solution is not suitable for a shadow-free, uniform illumination of parcels of different heights (EP-A- 0 312 980).

Thus, it is the object of the invention as specified in claim 1 to create a device for recording pictures of parcel surfaces for the purpose of detecting the distribution information on the parcel surfaces, such as receiver names and addresses. The device has a uniformly high resolution for parcels with different heights and illuminates the parcels in such a way that the parcel surface with distribution information, detected by the camera, is always illuminated uniformly and without shadows.

Illuminating the surface from the side and the corresponding selection of light cross sections, light distribution and beam direction in any case ensure a shadow-free illumination of the parcel surface.

The invention is explained with further detail in the following, with the aid of an exemplary embodiment and the drawing.

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Shown are in:

Figure 1 A schematic view from the side of the device for recording pictures, perpendicular to the conveying direction of the parcels.

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The parcels are conveyed on tilting trays 2, wherein conveyor belts can be used as well, in the direction indicated by arrow and at a speed of > 1.7 m/s. The distances between the parcels 1 can be 150 mm or less.

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Initially, they pass by two overhead installed sensors 3, for example ultrasound sensors, which measure the parcel height. A curtain of light on the side can be used as well.

Following this, the parcels 1 reach the recording area of a camera 4 that is installed centrally above the parcels and comprises a zoom lens 5 with autofocus. The camera 4 is equipped with a CCD diode row that scans the parcel surface during the transport. The zoom lens 5 is driven by a fast linear motor 6, which is actuated by a control device 7 to which the sensors 3 for measuring the parcel height are connected as well. In dependence on the previously measured parcel heights, the linear motor 6 is actuated by the control device 7 in such a way that the picture scale is always the same with uniform resolution, regardless of the parcel height.

A light barrier that is also connected to the control device 7 is connected upstream to activate the picture recording device and to report whether tilting trays 2 are occupied by parcels 1. Crosswise to the direction for conveying parcels 1 on the tilting trays 2 and at the level of camera 4, as seen in transporting direction, two lighting devices 8 are installed above and to the side of parcels 1, which beam light at an angle onto the parcels 1. The light direction, the illuminated surface and the distribution of the light from the lighting devices 8 are selected such that the parcel surface detected by the camera 4, which contains the distribution information, is always illuminated uniformly and without shadows for the different parcel heights.

1. A device for recording the pictures of parcel surfaces containing distribution information with a camera (4) that is aligned perpendicular to the parcel surface to be recorded and comprises a CCD sensor and a camera lens (5), with at least one sensor (3) for measuring the parcel heights and one control device (7) for creating adjustment signals for the camera (4) in dependence on the measured parcel height, further comprising a conveying means for continuously moving parcels past the camera, wherein the camera lens (5) of camera (4) is a zoom lens with fast zoom adjustment drive (6) and autofocus and wherein the fast zoom adjustment drive (6) can be actuated by the control device (7) in such a way that the picture scale is always the same, regardless of the previously measured height of the parcel surface containing the distribution information, **characterized in that** two or more lighting devices (8) are arranged crosswise to the conveying direction and to the side of the parcels (1) and that these devices beam light onto the parcels (1) at an angle, at a light cross section and light distribution that ensures that the parcel surface detected by the camera (4) at different parcel heights is always illuminated uniformly and so as to be free of shadows.

Abstract

Device for Recording Pictures of Parcel Surfaces

The invention relates to a device for recording pictures of parcel surfaces containing distribution information, said device having a camera (4) directed perpendicular to the parcel surface to be recorded and comprising a CCD sensor and a camera lens (5). The device is further provided with a sensor (3) for measuring the parcel height and a control device (7) for generating adjustment signals for the camera (4) in dependence on the measured parcel height and a conveying means for continuously moving parcels past the camera. According to the invention, the camera (4) is provided with a camera lens (5) that is a zoom lens with autofocus, as well as a fast zoom adjustment drive (6) to ensure a uniformly high resolution for parcels of different height. The fast zoom adjustment drive (6) can be actuated by the control device (7) in such a way that the picture scale is always the same, regardless of the previously measured height of the parcels containing the distribution information.

Figure 1

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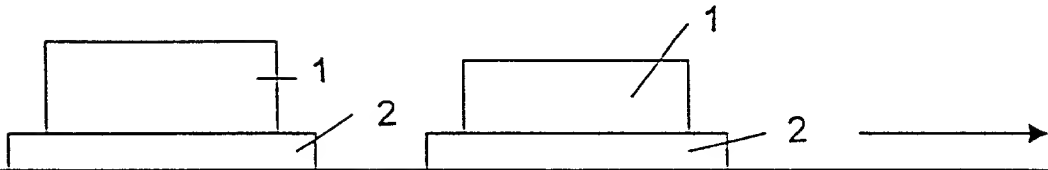
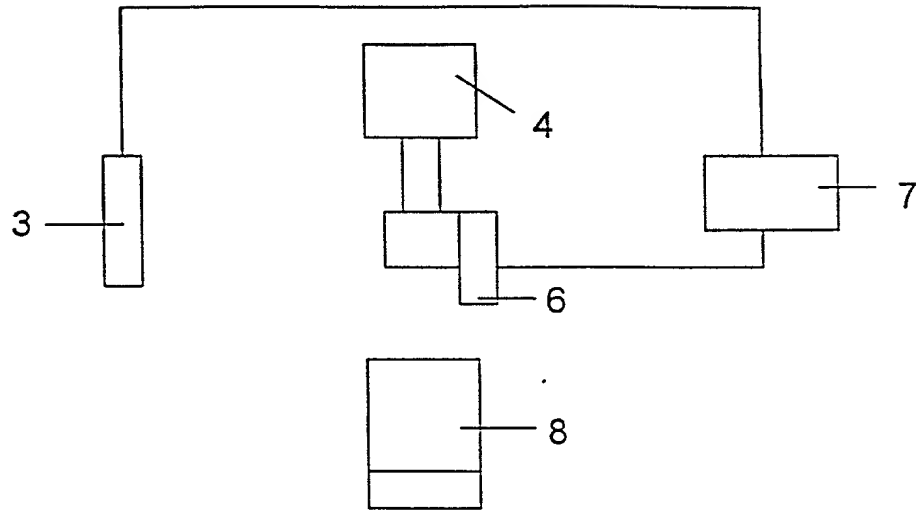


FIG 1

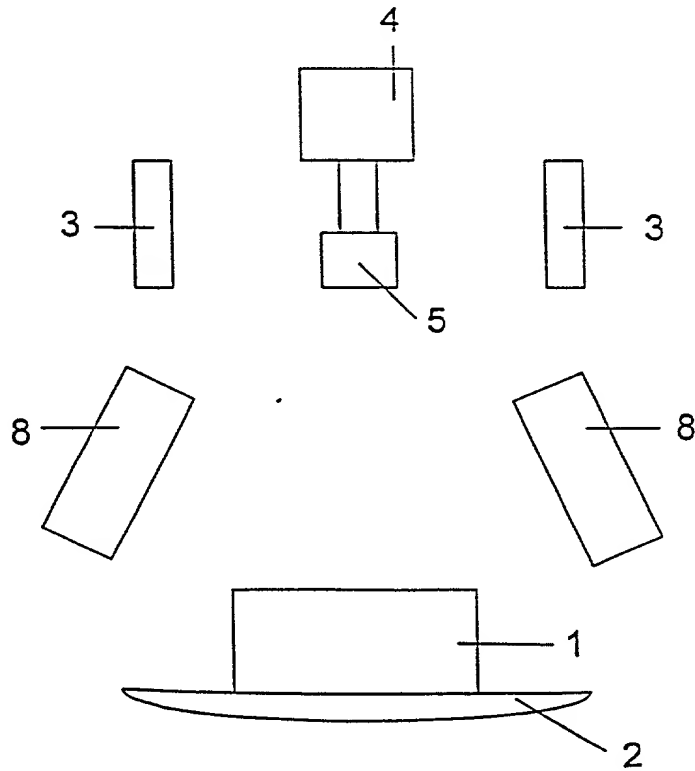


FIG 2

DECLARATION FOR UNITED STATES PATENT APPLICATION
POWER OF ATTORNEY, DESIGNATION OF CORRESPONDENCE ADDRESS

Attorney Docket
32221-170976

As a below named inventor, I hereby declare that my residence, post office address and citizenship are as stated below next to my name, and that I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled DEVICE FOR RECORDING PICTURES OF PARCEL SURFACES, the specification of which

[] is attached hereto.

[] was filed on _____, as Application Serial No. _____, Confirmation No. _____, and was amended on _____ [if applicable].

[X] was filed under the Patent Cooperation Treaty on November 2, 1999, as International Application No. PCT/DE99/03483 the United States of America being designated.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, 119 of any foreign application(s) for patent, utility model, design or inventor's certificate listed below and have also identified below any foreign application(s) for patent, utility model, design or inventor's certificate having a filing date before that of the application(s) on which priority is claimed:

Prior Foreign Application(s)			Priority Claimed	
Number	Country	Date Filed	Yes	No
198 51 284.8	Germany	November 6, 1998	X	

I hereby appoint the attorneys and agents of Venable associated with the following customer number to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:



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The undersigned hereby authorizes the U.S. attorneys identified herein to accept and follow instructions from the undersigned's assignee, if any, and/or, if the undersigned is not a resident of the United States, the undersigned's domestic attorney, patent attorney or patent agent, as to any action to be taken in the Patent and Trademark Office regarding this application without direct communication between the U.S. attorneys and the undersigned. In the event of a change in the person(s) from whom instructions may be taken, the U.S. attorneys identified herein will be so notified by the undersigned.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Date: 2. May, 2001.

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